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ABSTRACT

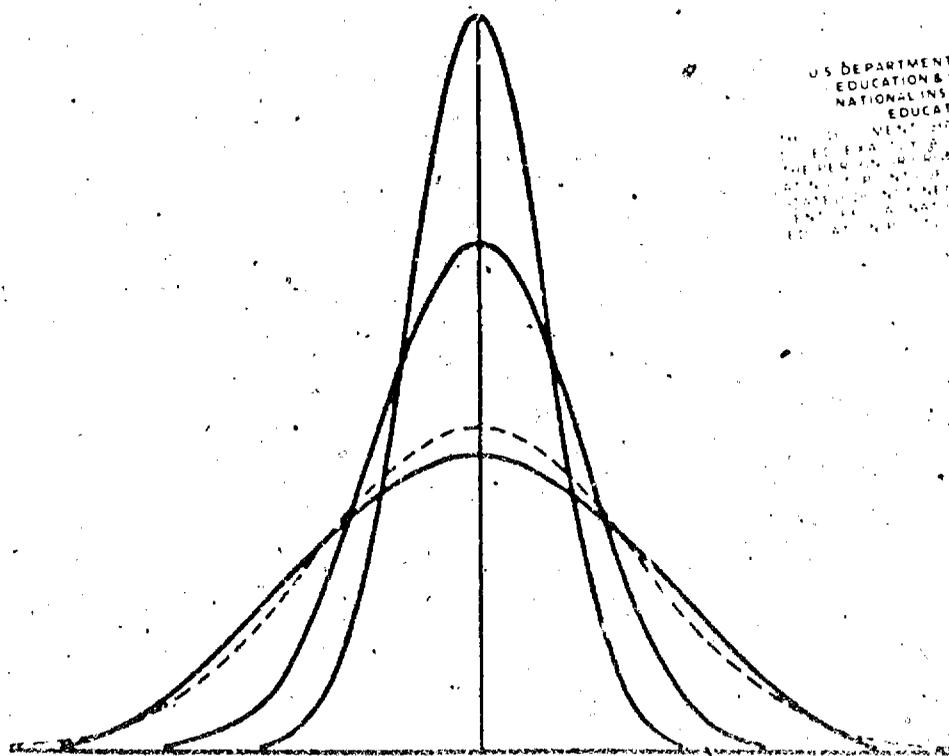
CEQ-The Advisor ratings from 400 of 763 class sections from the spring of 1971 administration were divided into two groups of 200 sections each. The sections were separated into five groups depending on the proportion of students taking the class as a requirement. These proportions were as follows: more than 4/5 of the student enrollment was mandatory, 3/5 to 4/5 of student enrollment was mandatory, etc. Identical analyses were performed on each sample with identical results. One-way analyses of variance (ANOVA) on each of the six subscales of the CEQ yielded statistically significant differences among the mean ratings of the five groups. Polynomial trend analyses subsequently showed that the linear trend was significant (p .01) in each case. This result implied that as the proportion of students taking a class because of a requirement increases, the ratings given to the course and instructor decreases. Suggestions were made to caution instructors about interpreting CEQ results for classes that have high or low proportions of requirement-enrolled students. It was suggested also that further investigations be performed in this area before the results presented here are regarded as conclusive evidence. (Author)

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# Research Report

**TITLE** WOULD THE PROPORTION OF STUDENTS TAKING A CLASS AS A REQUIREMENT AFFECT STUDENT RATING OF THE COURSE?

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### Abstract

CEQ-The Advisor ratings from 400 of 763 class sections from the spring of 1971 administration were divided into two groups of 200 sections each. The sections were separated into five groups depending on the proportion of students taking the class as a requirement. These proportions were as follows: more than 4/5 of the student enrollment was mandatory, 3/5 to 4/5 of student enrollment was mandatory, etc.

Identical analyses were performed on each sample with identical results. One-way analyses of variance (ANOVA) on each of the six subscales of the CEQ yielded statistically significant differences among the mean ratings of the five groups. Polynomial trend analyses subsequently showed that the linear trend was significant ( $p < .01$ ) in each case. This result implied that as the proportion of students taking a class because of a requirement increases, the ratings given to the course and instructor decreases.

Suggestions were made to caution instructors about interpreting CEQ results for classes which have high or low proportions of requirement enrolled students. It was suggested also that further investigations be performed in this area before the results presented here are regarded as conclusive evidence.

WOULD THE PROPORTION OF STUDENTS TAKING A  
CLASS AS A REQUIREMENT AFFECT STUDENT RATING OF THE COURSE?

Gerald M. Gillmore and Dale C. Brandenburg

The perennial problem of determining the effectiveness of the college instructor has been pondered over, particularly by those directly involved in the educational system. To have college instructors rated by their students is not a universally accepted procedure among college staffs, instead it presents an area of controversy. Sources of objections to such a procedure are manifold, especially from the faculty members who are probably worried about their possible rating and from administrators who are concerned about faculty morale. Ryans (1954) discussed this attitude of college instructors toward student ratings and listed reasons why instructors are generally opposed to having their students rate them.

At the University of Illinois, Urbana-Champaign, one instrument used to evaluate teaching effectiveness was the Illinois Course Evaluation Questionnaire-The Advisor (CEQ-The Advisor). In 1962 a committee from the Student Senate agreed to investigate the quality of teaching on the campus (Dillman, 1970). From 1962 until 1968, several polls of student opinion of teacher effectiveness were taken at the University. However, a complete overview of student opinion could not be obtained for a number of reasons. Finally, in 1968, the Subcommittee on Course and Teacher Evaluation of the Educational Affairs Committee of the Student Senate, with the cooperation of the deans and heads of departments of the colleges, decided to obtain an evaluation of teachers and courses by distributing questionnaires in the classroom. Starting in the school year of 1968, students rated their instructors and courses by answering objective questions on computerized forms at the end

of each semester. On the back of the questionnaire form they also responded to open-ended questions, such as: What are your general comments about the instructor in this course? For thorough details about the development of The Advisor see Feldman's report (1970).

The questionnaire used for evaluating the courses offered in the spring semester of 1972 was called the CEQ-The Advisor. The CEQ instrument consists of 50 items which are divided into six subscales: General Course Attitude, Method of Instruction, Course Content, Interest - Attention, Instructor, and Specific Items (Alzamoni and Spencer, 1973). The first through the fifth subscales contain eight items each; the last subscale has ten items (see Appendix A). This information is shown in Table 1.

Table 1

## Subscales of the CEQ-The Advisor

Subscales	Number of Items
1. General Course Attitude	8
2. Method of Instruction	8
3. Course Content	8
4. Interest - Attention	8
5. Instructor	8
6. Specific Items	10
Total	50

Students indicate their degree of agreement or disagreement on each item. Responses to the 50 questionnaire items are based on a four-point scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). These alternatives receive the weight of 4, 3, 2, and 1, respectively,

for the positively stated items and the reverse weighting for the negative ones. Each item has a predetermined best answer which receives the highest weight. The mean of each item is calculated by the arithmetic average of the students' responses. Higher means on the CEQ-The Advisor indicate more favorable attitudes.

The CEQ-The Advisor is voluntarily administered by the instructor to his class. After the answer sheets are scored the results are returned to the instructor who administered the instrument. The purposes of the CEQ-The Advisor are to provide the instructor with some insight into the manner in which he and his course are perceived by his students and thus suggest ways to improve his course; to make publication of results available to the students; to give the students an opportunity to gain broader knowledge of course material, methods, and objectives than is now available; and to enable the administrators within each college to gain insight into the overall effectiveness of its course offerings.

The purpose of this study was to determine whether student overall ratings of courses are affected by the proportion of the class taking it as a requirement. In other words, does the class with the majority, say 80%, of students taking it as a requirement receive lower ratings than a class with a smaller percentage of students taking it as a requirement? Other investigations (Gage, 1961; Heilman and Armentrout, 1936; Lovell and Haner, 1955) have shown conflicting results. The null hypothesis to be tested was that there is no significant difference among the ratings obtained when differing proportions of students take a course as a requirement.

## Method

### *Subjects*

The data was obtained from instructors who voluntarily administered the CEQ-The Advisor to their classes in the spring semester of 1971. Both undergraduate and graduate level classes were used. The instrument was administered during regular class or final examination periods. In all classes, the questionnaire was given near enough to the end of the semester so that students could estimate their current performance in the course. A total of 763 class sections were available for study.

### *Variables*

This study used the six CEQ subscales as dependent variables. These are: (1) General Course Attitude, (2) Method of Instruction, (3) Course Content, (4) Interest - Attention, (5) Instructor, and (6) Specific Items. The independent variable, proportion of students taking a course as a requirement, was formed by dividing available class results into five groups as follows:

Group 1 was composed of the classes which had 80% of the students taking the course as a requirement.

Group 2 was composed of the classes which had 60% to 79% of the students taking the course as a requirement.

Groups 3, 4, and 5 similarly consisted of 40% to 59%, 20% to 39%, and less than 20% of the students taking the course as a requirement, respectively.

### *Data Analysis*

In this study the total sample of 763 sections was randomly divided into two samples of 200 sections each. The only restriction of selecting the data was that the same course taught by the same instructor was not included in the same group. The differences in ratings were examined within each subscale.

Means for each subscale of each group were computed. One-way ANOVA was used for investigating the difference in ratings within each subscale. The overall strength of association between the percentage of students taking courses as a requirement and the rating was estimated by the following formula (Hays, 1963, p. 382).

$$\text{est } \omega^2 = \frac{SS \text{ between} - (J - 1) MS \text{ within}}{SS \text{ total} + MS \text{ within}}$$

where  $J$  = number of groups.

The polynomial regression technique<sup>1</sup> was then applied in order to investigate the trend of the relationship between dependent and independent variables within each sample.

## Results

### *General Course Attitude*

The means obtained from the ratings for the five groups in both samples are shown in Table 2. For Sample 1, the highest mean was 3.32 and the lowest was 2.94; for Sample 2, the highest mean was 3.37 and the lowest was 2.93. The classes which had less than 20% of the students taking the course as a requirement received the highest rating, while the lowest rating was observed for the group which had more than 80% required-enrollment students. The results in both samples were similar.

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<sup>1</sup>It should be noted that the polynomial regression technique was applied in this case even though there may have been a violation of one of its assumptions. That is, the abscissa had five points which do not necessarily constitute an interval scale. However, we are confident that the measure on the abscissa (proportion of class) is at least monotonically related to the true proportion scale based on group means. Therefore, our analyses for trend are approximate and the seriousness of the violation cannot be regarded as a detriment to the results in general (Nunnally, 1967, p. 25).

Table 2  
Means for General Course Attitude

Group	N		$\bar{X}$	
	Sample 1	Sample 2	Sample 1	Sample 2
1. 80-100% required	56	80	2.94	2.93
2. 60-79% required	27	35	3.11	3.04
3. 40-59% required	27	26	3.04	3.21
4. 20-39% required	48	22	3.24	3.26
5. Less than 20% required	42	37	3.32	3.37

One-way ANOVA was performed using the proportion of required-enrollment students as the independent variable and the obtained subscale ratings as the dependent variable. The F-ratio was statistically significant with probability of less than .01 in both samples (see Table 3 for ANOVA). The index of  $\omega^2$  showed that the independent variable was estimated to account for only 12% of the variance in the ratings for Sample 1, and 20% for Sample 2. Thus, knowing a student's group membership does not appreciably assist in predicting his rating of the class. In both samples, the trend of the relationship between the independent and dependent variables was linear. In other words, the linear regression was fitted to the data, and it was found to be statistically significant at the .01 level. This result is shown in Table 3 and graphed in Figure 1.

Table 3  
One-way ANOVA Including the Test for Linear  
Trend and Estimated  $\omega^2$  for General Course Attitude

Source of Variation	df	SS	MS	F	$\omega^2$
Sample 1					
Between Groups	4	4.4922	1.1231	7.8858*	0.1210
Linear Trend	1	4.0974	4.0974	28.7739*	
Residual	3	0.3948	0.1316		
Within Groups	195	27.7709	0.1424		
Total	199	32.2631			
Sample 2					
Between Groups	4	5.9354	1.4838	13.4182*	0.1990
Linear Trend	1	5.8580	5.8580	52.9656*	
Residual	3	0.0774	0.0258		
Within Groups	195	21.5639	0.1106		
Total	199	27.4993			

\* $p < .01$

#### *Method of Instruction*

The means for the Method of Instruction subscale are given in Table 4. In both samples, the highest ratings were in the fifth group, i.e., less than 20% of required-enrollment students, while the classes which had more than 80% of required-enrollment students received the lowest ratings.

FIGURE 1

# LINEAR RELATIONSHIPS OF MEAN RATINGS FOR GENERAL COURSE ATTITUDE

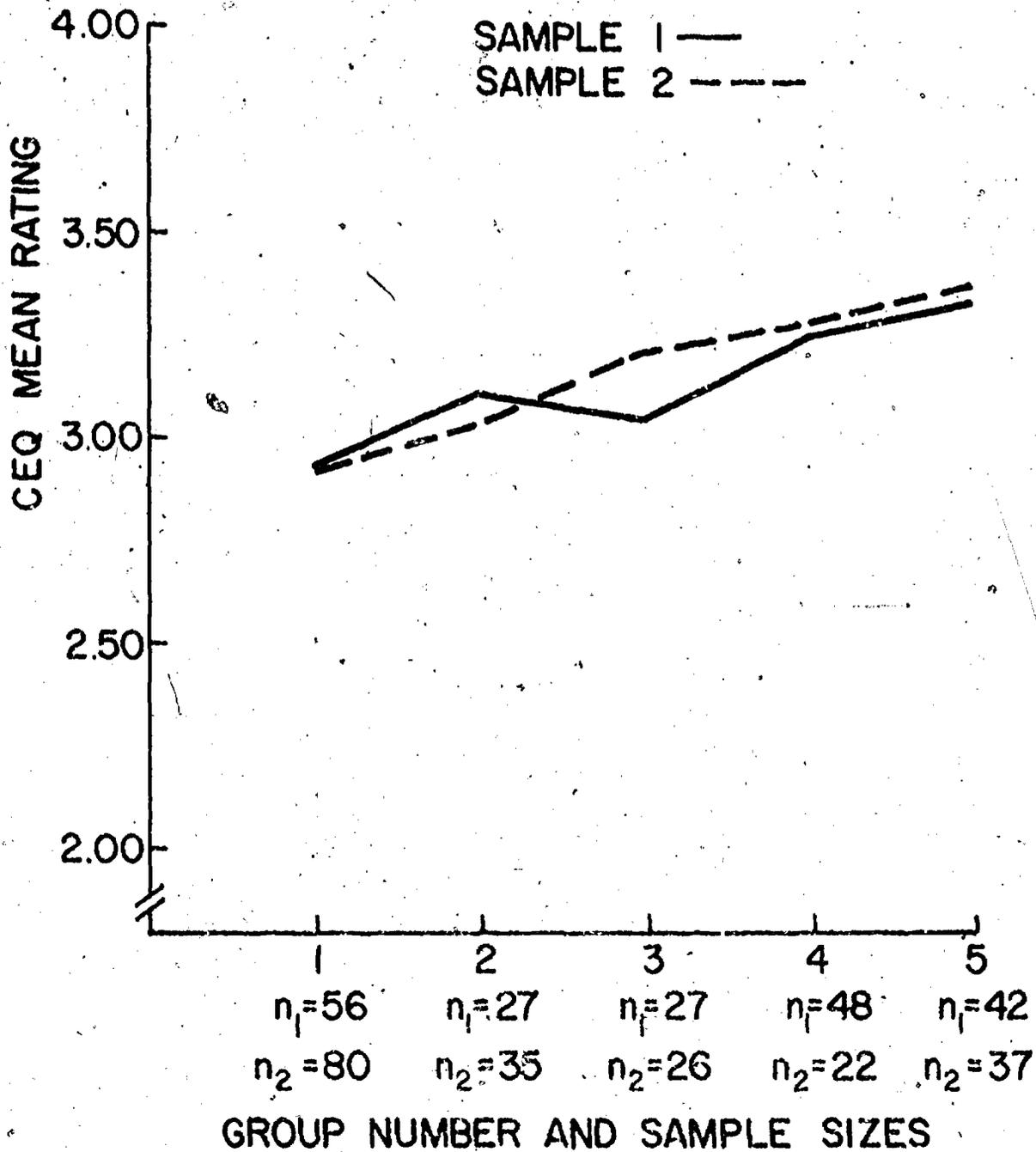


Table 4  
Means for Method of Instruction

Group	N		X	
	Sample 1	Sample 2	Sample 1	Sample 2
1	56	80	2.69	2.72
2	27	35	2.87	2.86
3	27	26	2.78	2.90
4	48	22	2.95	2.86
5	42	37	2.98	3.08
Total	200	200	2.85	2.85

The results of one-way ANOVA are shown in Table 5. The tests yielded significant  $F$ -ratios with probability less than .01 in both samples. However, the proportion of required-enrollment students in class was estimated (via  $\omega^2$ ) to account for about 6% of the variance for Sample 1 ratings and slightly over 8% for Sample 2. The trend analysis showed that linear regression was fitted to the data in both cases and the result was statistically significant at .01 level as shown in Table 4. An illustration of the linear trend for mean ratings is given in Figure 2.

#### Course Content

The first group of students gave the lowest mean ratings for the Course Content subscale, specifically, 2.78 and 2.70 for Sample 1 and Sample 2, respectively. The classes which were composed of less than 20% of required-enrollment students received the highest ratings as shown in Table 6. These were 3.04 for Sample 1 and 3.08 for Sample 2. In Sample 2, the class rating means increased as the proportion of the required-enrollment students decreased. A similar result can be noted in Sample 1 except for a reversal between Groups 2 and 3.

Table 5  
 One-way ANOVA Including the Test for Linear  
 Trend and Estimated  $\omega^2$  for Method of Instruction

Source of Variation	df	SS	MS	F	$\omega^2$
Sample 1					
Between Groups	4	2.7600	0.6900	4.0584*	0.0576
Linear Trend	1	2.3515	2.3515	13.8324*	
Residual	3	0.4085	0.1362		
Within Groups	195	33.1527	0.1700		
Total	199	35.9127			
Sample 2					
Between Groups	4	3.5442	0.8860	5.6248*	0.0847
Linear Trend	1	3.1377	3.1377	19.9219*	
Residual	3	0.4065	0.1355		
Within Groups	195	30.7175	0.1575		
Total	199	34.2617			

\*p < .01

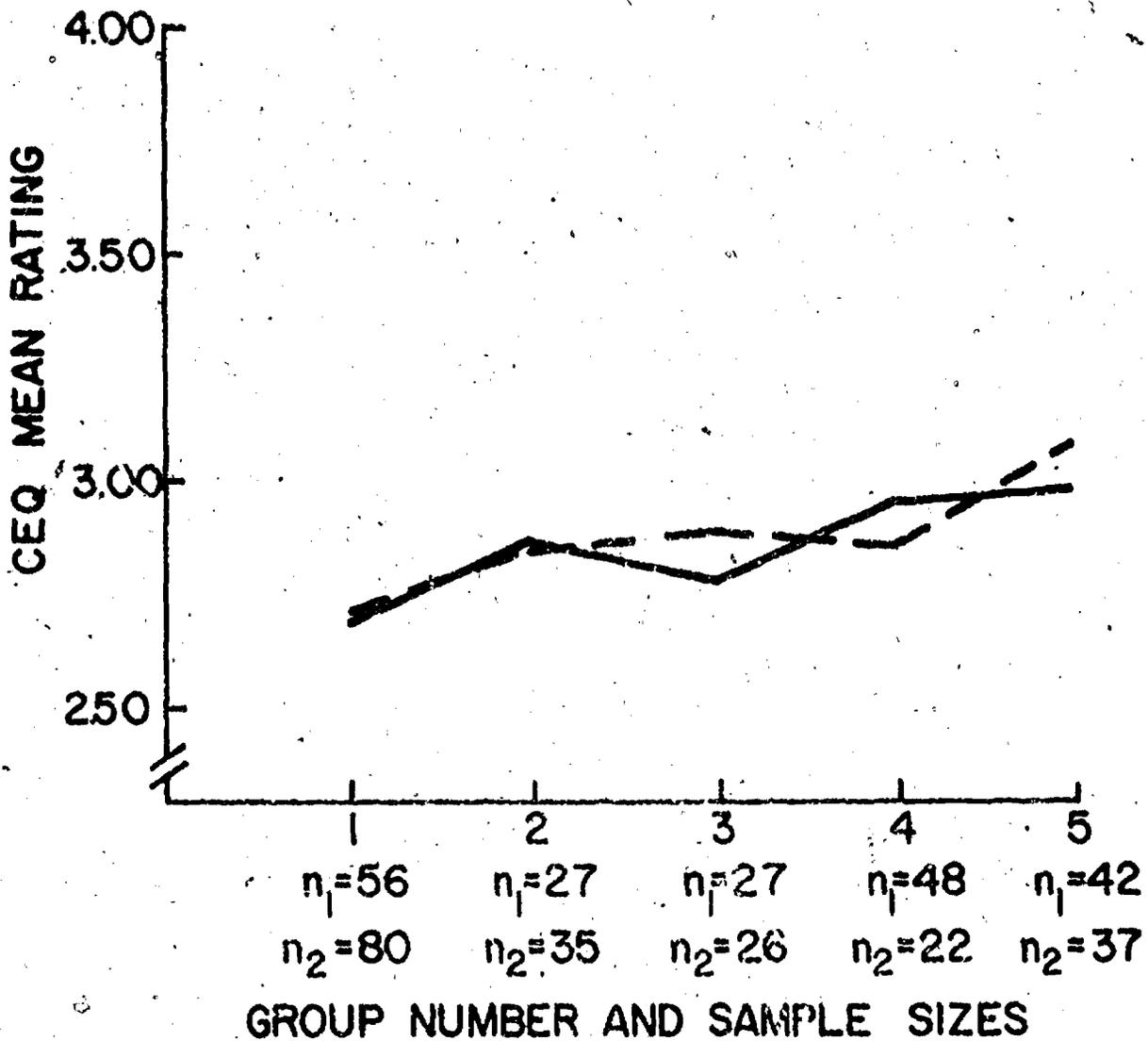
Table 6  
 Means for Course Content

Group	N		X	
	Sample 1	Sample 2	Sample 1	Sample 2
1	56	80	2.78	2.70
2	27	35	2.88	2.82
3	27	26	2.86	2.95
4	48	22	3.00	3.03
5	42	37	3.04	3.08
Total	200	200	2.91	2.86

FIGURE 2

# LINEAR RELATIONSHIPS OF MEAN RATINGS FOR METHOD OF INSTRUCTION

SAMPLE 1 ———  
SAMPLE 2 - - - -



The  $F$ -ratio from one-way ANOVA was significant at .01 level in both samples. The estimated  $\omega^2$  for Samples 1 and 2 were .11 and .24, respectively. The linear trend was statistically significant at 1% level. The results of the above analyses are presented in Table 7. Figure 3 shows the linear trend for the mean ratings of each group in each sample.

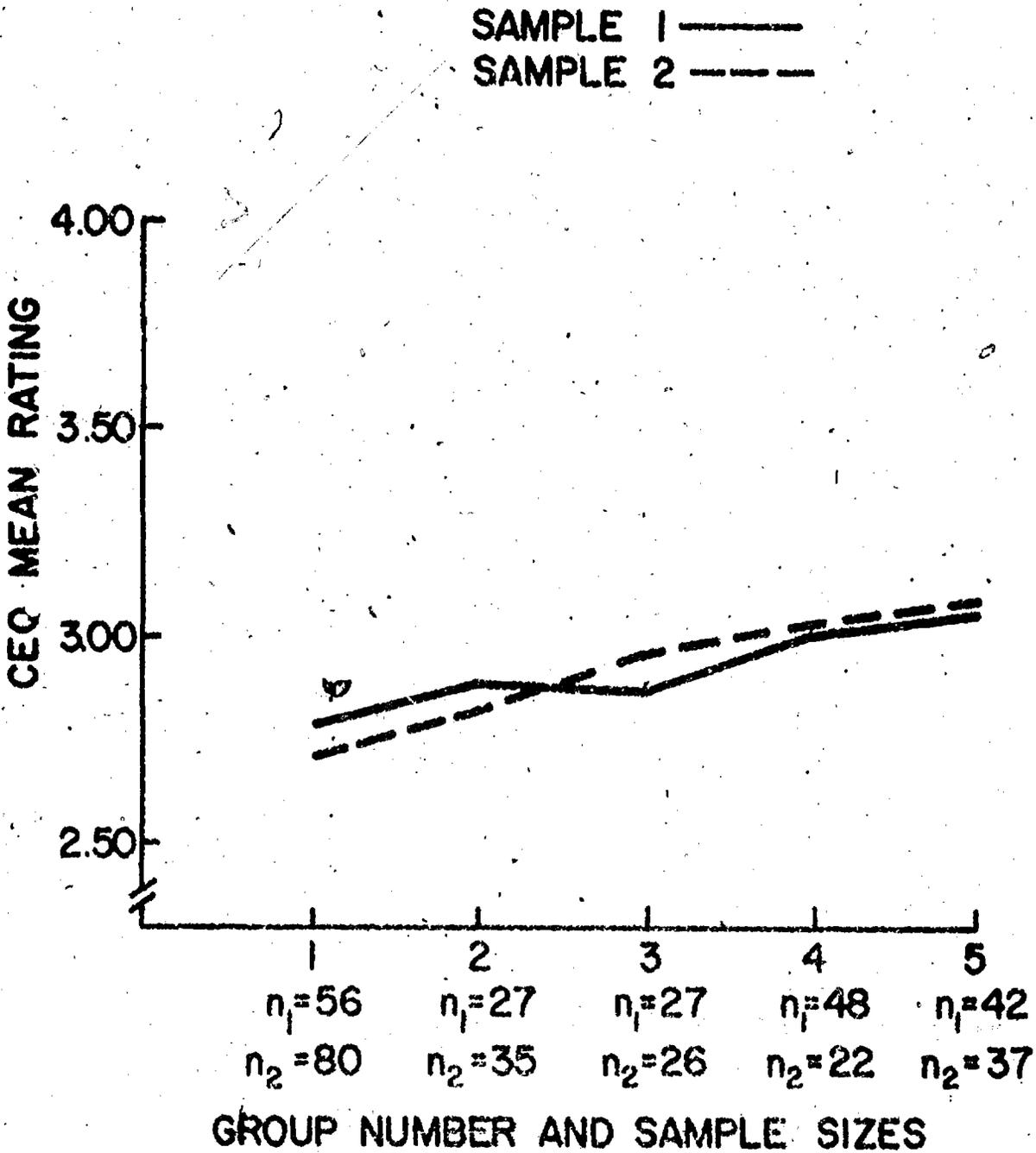
Table 7  
One-way ANOVA Including the Test for Linear  
Trend and Estimated  $\omega^2$  for Course Content

Source of Variation	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	$\omega^2$
Sample 1					
Between Groups	4	2.0965	0.5241	6.9197*	0.1063
Linear Trend	1	1.9577	1.9577	25.8613*	
Residual	3	0.1388	0.0463		
Within Groups	195	14.7701	0.0757		
Total	199	16.8666			
Sample 2					
Between Groups	4	4.5993	0.1150	16.6740*	0.2387
Linear Trend	1	4.4932	4.4932	65.1188*	
Residual	3	0.1051	0.0350		
Within Groups	195	13.4469	0.0690		
Total	199	18.0462			

\* $p < .01$

FIGURE 3

# LINEAR RELATIONSHIPS OF MEAN RATINGS FOR COURSE CONTENT



### Interest - Attention

As observed in the previous analyses, the group which had less than 20% of the required-enrollment students in class gave the highest ratings for this subscale in both samples. The lowest ratings for the Interest - Attention subscale were in the first group and these were 2.61 and 2.62 for Samples 1 and 2, respectively. The means for this subscale are shown in Table 8.

Table 8

Means for Interest - Attention

Group	N		X	
	Sample 1	Sample 2	Sample 1	Sample 2
1	56	80	2.61	2.62
2	27	35	2.82	2.75
3	27	26	2.75	2.94
4	48	22	2.99	2.99
5	42	37	3.02	3.11
Total	200	200	2.84	2.82

According to the one-way ANOVA results, the hypothesis of no effect of the proportion of the required-enrollment students in class on the ratings was rejected at .01 level in both samples. Approximately 12% and 19% of the variance in ratings (estimated by  $\omega^2$ ) was accounted for by the proportion of the required-enrollment students in Samples 1 and 2, respectively. The result of the trend analysis was significant at .01 level for a linear trend. Therefore, the linear regression was fitted to both data sets. The results of these analyses are given in Table 9. Figure 4 illustrates the linear trend for the mean ratings of this variable for each group in each sample.

Table 9  
One-way ANOVA Including the Test for Linear  
Trend and Estimated  $\omega^2$  for Interest - Attention

Source of Variation	df	SS	MS	F	$\omega^2$
Sample 1					
Between Groups	4	5.5610	1.3903	7.9181*	0.1215
Linear Trend	1	4.9641	4.9641	28.2694*	
Residual	3	0.5969	0.1990		
Within Groups	195	34.2381	0.1756		
Total	199	39.7991			
Sample 2					
Between Groups	4	7.5298	1.8825	12.9811*	0.1933
Linear Trend	1	7.3914	7.3914	50.9752*	
Residual	3	0.1384	0.0461		
Within Groups	195	28.2780	0.1450		
Total	199	35.8079			

\*p < .01

### *Instructor*

The means of instructor rating are presented in Table 10. The instructors teaching classes which had more than 80% of the required-enrollment students (Group 1) received the lowest rating, i.e., 3.06 and 3.03 in Samples 1 and 2, respectively. The instructors teaching the fourth group, i.e., 20% -39% of the required-enrollment students, received the highest ratings in Sample 1 and the ones teaching less than 20% of the required-enrollment students received the highest ratings in Sample 2.

FIGURE 4

# LINEAR RELATIONSHIPS OF MEAN RATINGS FOR INTEREST-ATTENTION

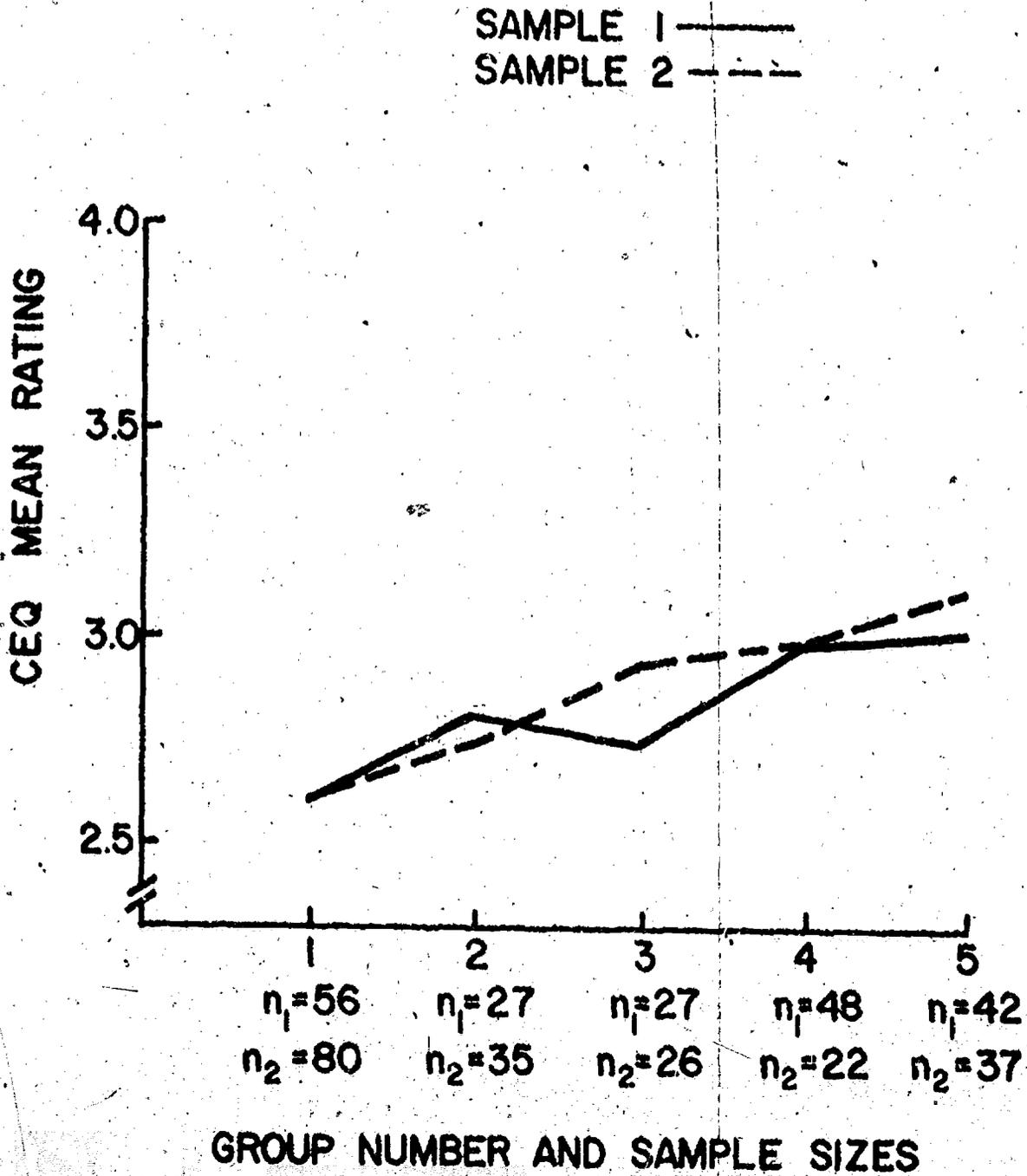


Table 10  
Means for Instructor

Group	N		X	
	Sample 1	Sample 2	Sample 1	Sample 2
1	56	80	3.06	3.03
2	27	35	3.14	3.12
3	27	26	3.12	3.14
4	48	22	3.24	3.17
5	42	37	3.22	3.27
Total	200	200	3.16	3.12

The results of one-way ANOVA are given in Table 11. The F-ratio was significant at .05 level for Sample 1, and at .01 for Sample 2. The proportion of the required-enrollment students in class was estimated by  $\omega^2$  to account for only about 3% and 6% of the variance in the instructor ratings in Samples 1 and 2, respectively. Only the linear regression was significant at .01 level in both sets. The results are given in Table 11. Figure 5 shows the linear trend for the mean ratings of the instructor subscale.

#### *Specific Items*

For the Specific Items subscale, the highest ratings were in the fifth group, i.e., 2.98 and 3.02 in Samples 1 and 2, respectively. Again, the first group gave the lowest ratings, i.e., 2.85 and 2.81 in Samples 1 and 2, respectively. The mean ratings increased as the proportion of the required-enrollment students decreased in Sample 2 and a similar result was noted for Sample 1 except for a reversal for Groups 2 and 3. The results are shown in Table 12.

Table 11  
 One-way ANOVA Including the Test for Linear  
 Trend and Estimated  $\omega^2$  for Instructor

Source of Variation	df	SS	MS	F	$\omega^2$
Sample 1					
Between Groups	4	1.0120	0.2530	2.4472*	0.0281
Linear Trend	1	0.8341	0.8341	8.0667**	
Residual	3	0.1779	0.0593		
Within Groups	195	20.1585	0.1034		
Total	199	21.1705			
Sample 2					
Between Groups	4	1.5433	0.3858	4.2554**	0.0611
Linear Trend	1	1.4916	1.4916	16.4454**	
Residual	3	0.0517	0.0172		
Within Groups	195	17.6803	0.0907		
Total	199	19.2236			

\*p &lt; .05

\*\*p &lt; .01

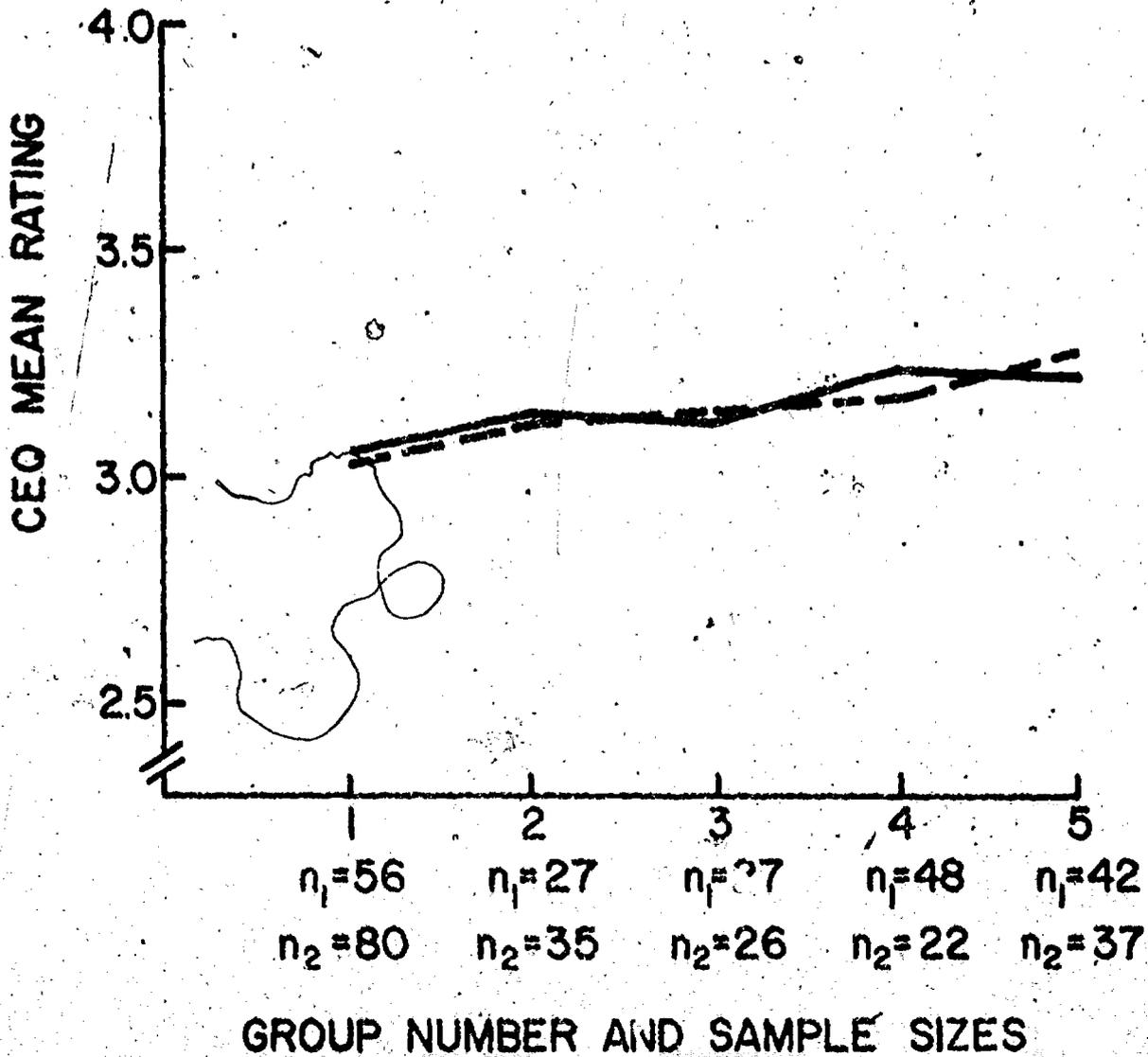
Table 12  
 Means for Specific Items

Group	N		X	
	Sample 1	Sample 2	Sample 1	Sample 2
1	56	80	2.85	2.81
2	27	35	2.92	2.89
3	27	26	2.87	2.97
4	48	22	2.96	2.98
5	42	37	2.98	3.02
Total	200	200	2.92	2.90

FIGURE 5

# LINEAR RELATIONSHIPS OF MEAN RATINGS FOR INSTRUCTOR

SAMPLE 1 ———  
SAMPLE 2 - - - -



Significant differences in ratings were found at the .05 level in Sample 1 and at the .01 level in Sample 2. Approximately 3% and slightly over 9% of the variances (estimated by  $\omega^2$ ) in ratings were accounted for by the percentage of required-enrollment students in Samples 1 and 2, respectively. In both data sets, the trend analysis was not significant beyond linear. The resultant analyses are presented in Table 13. Figure 6 shows the linear trend for the mean ratings for each group within each sample.

Table 13

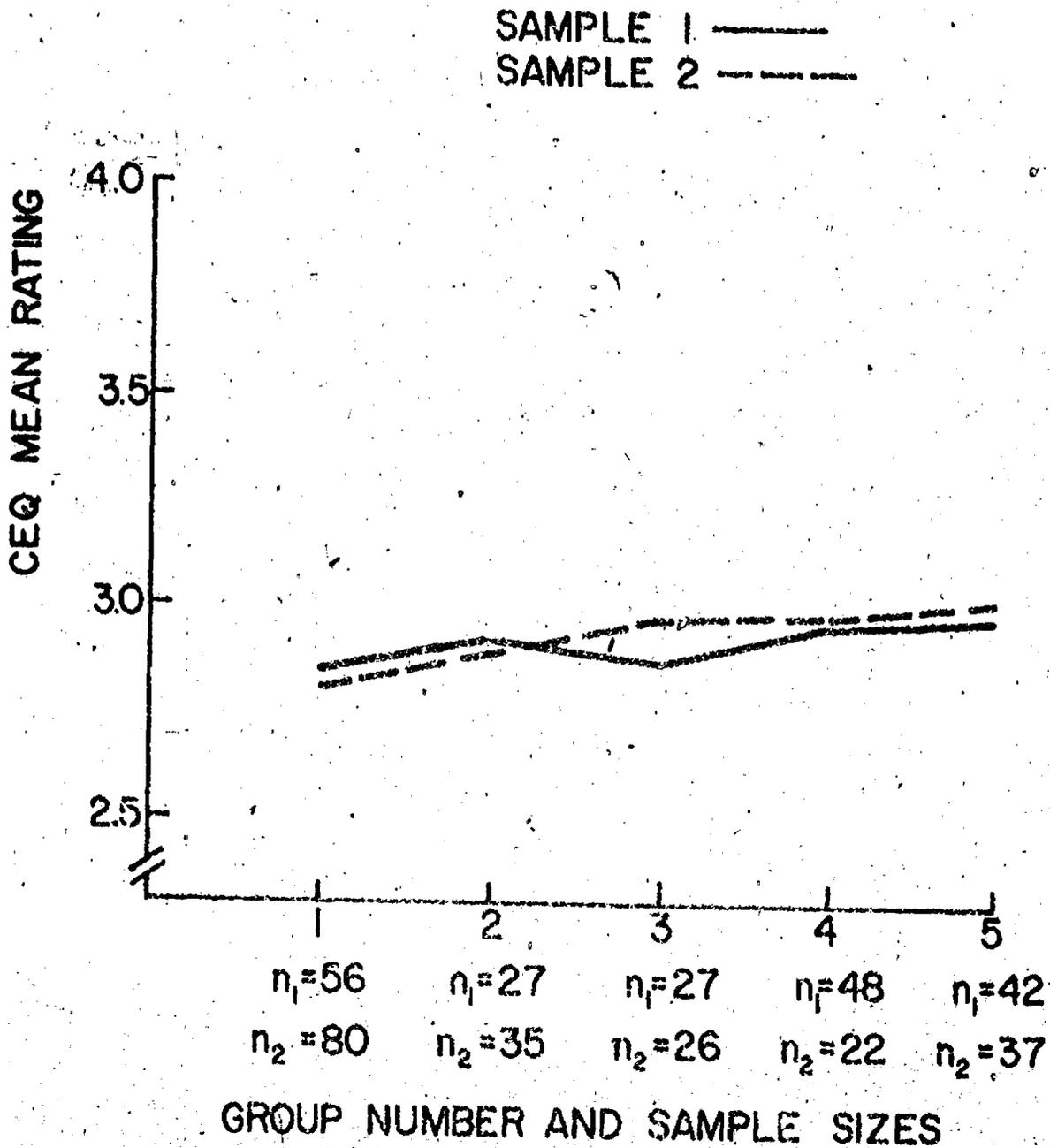
One-way ANOVA Including the Test for Linear  
Trend and Estimated  $\omega^2$  for Specific Items

Source of Variation	df	SS	MS	F	$\omega^2$
Sample 1					
Between Groups	4	0.6215	0.1554	2.5731*	0.0305
Linear Trend	1	0.5195	0.5195	8.6010**	
Residual	3	0.1020	0.0340		
Within Groups	195	11.7747	0.0604		
Total	199	12.3962			
Sample 2					
Between Groups	4	1.4096	0.3524	6.1956**	0.0941
Linear Trend	1	1.3268	1.3268	23.3181**	
Residual	3	0.0828	0.0276		
Within Groups	195	11.0914	0.0569		
Total	199	12.5010			

\*p &lt; .05

\*\*p &lt; .01

FIGURE 6  
 LINEAR RELATIONSHIPS OF MEAN RATINGS FOR SPECIFIC ITEMS



### Discussion and Conclusions

The results of the study clearly indicate that instructors and courses get different ratings using the CEQ-The Advisor depending upon the proportion of students enrolled in a class who take that class as a requirement. In general, it was found that the larger the proportion of students taking a course as a requirement, the lower the ratings given to the course.

This conclusion is justified for the following two reasons:

- (1) The overall  $F$ -ratio for each of the six CEQ-The Advisor subscales for each of the two samples of class sections were statistically significant.
- (2) The results of the trend analyses for each subscale and sample indicate a statistically significant linear trend. In each case it was determined that the linear regression line fitted the data substantially better than any higher-order regression line ( $p < .01$  for linear; others not significant).

Thus, it is concluded that the linear standardized regression weight is different from zero (here, positive) for each analysis.

It can be observed from the tables of means for each subscale that there does not appear to be substantial differences between the highest and lowest means for either of the two samples. However, if these means are interpreted in reference to the norms for any of the subscales, obvious and important decile differences can be noted. To illustrate this point Table 14 was developed in reference to the subscale norms from the CEQ Manual (Aleamoni, 1972) for total University of Illinois sections and the *smaller* of the two sample mean differences between Group 1 and Group 5.

Table 14  
Norm Decile Changes Corresponding to Group 1  
and Group 5 Mean Differences

Subscale	Means and Difference			Decile Change	
	Group 1	Group 5	Diff.	Group 1	Group 5
General Course Attitude	2.94	3.32	.38	3	7
Method of Instruction	2.69	2.98	.29	4	6
Course Content	2.78	3.04	.26	4	7
Interest - Attention	2.61	3.02	.41	3	7
Instructor	3.06	3.22	.16	4	5
Specific Items	2.85	2.98	.13	4	7

It is easy to see from Table 14 that Group 1 ratings are below the median and Group 5 ratings are at, or above, the median for each subscale.

This result has clear implications toward the interpretation of CEQ ratings for classes which have high or low proportions of required-enrollment students in a class. However, we cannot confidently conclude that required courses will always receive low ratings simply because those courses are "dull" from the student's point of view. These results, on the other hand, do show in general that instructors in these courses are penalized because of the course's status.

Other variables that may influence these ratings should be investigated before separate norm tables or another similar method is used to equalize the affect of required-enrollment. It is also necessary to replicate this study with data from other semesters. These investigations should be undertaken before the results presented here should be regarded as conclusive evidence.

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Appendix A



Please use this side of the form for your personal comments on teacher effectiveness and general course value -- then turn it over and answer the objective questions on the other side, using pencil only. Remember -- these questionnaires will be collected by a student in your class and mailed by him to the Advisor staff. Your instructor will not see your completed evaluation.

**COURSE CONTENT**

Please give your comments on the course content, subject matter and any particular relevance this course has had to your area of study.

**INSTRUCTORS** Write the name of your Principle instructor \_\_\_\_\_

T.A. \_\_\_\_\_

What are your general comments about the instructor in this course?

**PAPERS AND HOMEWORK**

Comment on the value of books, homework, and papers (if any) in this course.

**EXAMS**

Comment on the exams, (quizzes, practicals) as to difficulty, fairness, etc.

**GENERAL**

1. What improvements in this course would you suggest?

2. Please give your thoughtful evaluation of this course with comments. Are you satisfied with what you got out of this course? Do you consider it a valuable educational experience? Simply a means of passing a requirement? Or a disappointment? Please comment.

PLEASE FILL OUT THE OTHER SIDE.